

Attn: FCC  
ECR Inquiry

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## **Inquiry for Equipment Compliance Review (ECR) for acceptance of Data Referencing**

Dear Sir/Madame,

### **Introduction:**

We (Rosemount Tank Radar AB, Sweden, with FCC Grantee Code: K8C (FRN: 0025969163)) hereby request FCC acceptance of Data Referencing of test results for a new product “**Rosemount 3408 WIRELESS Level transmitter**” (with Wireless HART Protocol (“WiHART”)) based on the similarities to an existing FCC approved product, the **Rosemount 3408 Level Transmitter**. The test data to be referenced concerns the radar, which is identical for the new and the referenced product.

The FCC Grantee code K8C applies both for the new and the referenced products.

The existing product Rosemount 3408 Level transmitter as well as the new 3408 WIRELESS Level transmitter are FMCW Radar based Level sensors, working in the **77-81 GHz band**. Depending on antenna version, the radar complies either with

- LPR (Level Probing Radar) according **47 CFR Part 15.256**, or
- TLPR (Tank Level Probing Radar) according **47CFR Part 15.209 and 15.109**.

Based on the reasons described in the “Justification” section, Rosemount Tank Radar AB claims and takes full responsibility for the conclusion that the existing test reports for the Radar assessment are applicable also for the “Rosemount 3408 WIRELESS Level Transmitter”.

Note: This request is only for tests related to the Radar standards referred to above. Assessment/testing for the Wireless HART radio (Part 15.247 and 15.407) and Part 15B will be done and is not in the scope of this request.

The referenced reports were used for FCC approval of the Rosemount 3408 Level transmitter, with FCC ID:s K8C3408L, K8C3408LB, K8C3408T and K8C3408TB.

Applicable TCB is Cetecom (CTC) Advanced GmbH, Saarbruecken, Germany.

**Justification:**

The similarities between the two versions are that the following parts are identical:

- The Microwave Board (PMW), containing the full RF chain including frequency generation and modulation.
- The Waveguide/antenna connection
- The Antennas

In addition, both products use metallic enclosures and the same display Cover (with glass).

The main differences are:

- The existing 3408 Level transmitter uses wired DC power with HART communication, and optional Bluetooth connectivity, vs
- The new 3408 WIRELESS Level transmitter is fully Wireless (battery powered) and communicates via Wireless HART (WiHART). (No option for Bluetooth connectivity).

Please see figures in next section for more information.

Note: The existing Bluetooth radio has an PCB-integrated antenna (on board inside the enclosure), which transmits higher levels within the enclosure than the WiHART radio which uses external antennas. Bluetooth and WiHART use the same frequency band (2405-2475 MHz), so possibility of RF mix harmonics is lower for the WiHART radio than for the current Bluetooth radio.

Because of this, we request that the following existing test reports from CTC Advanced (now: Cetecom Advanced) are representative for the emitted RF signal and high frequency emissions can be used for Data Referencing:

- Report 1-3693/21-01-09 for LPR according **FCC Part 15.256**, and **15.215(c)**
- Report 1-3693/21-01-04 for TLPR according **FCC Part 15.209** and **15.109**.



### Illustrations:

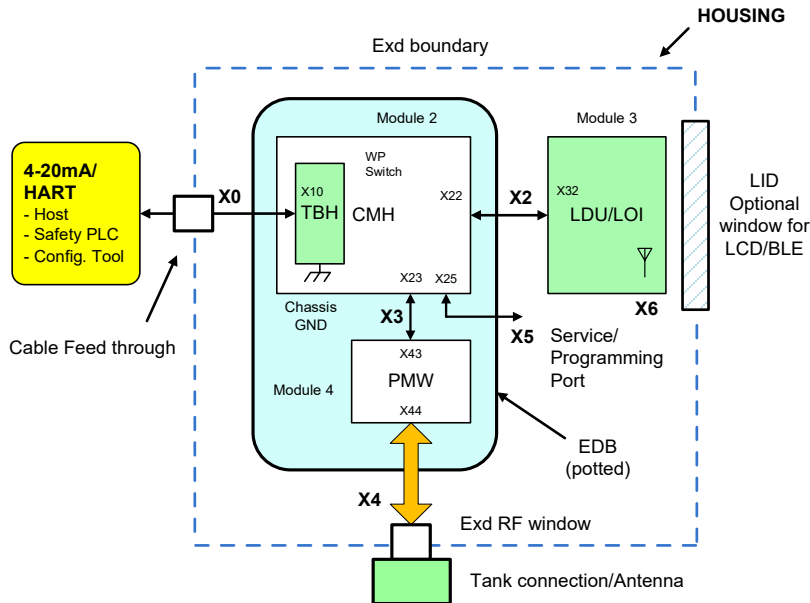


Figure 1: Block diagram of existing product (3408 Level transmitter). Radar is PMW (Module 4). (Bluetooth is Module 3)

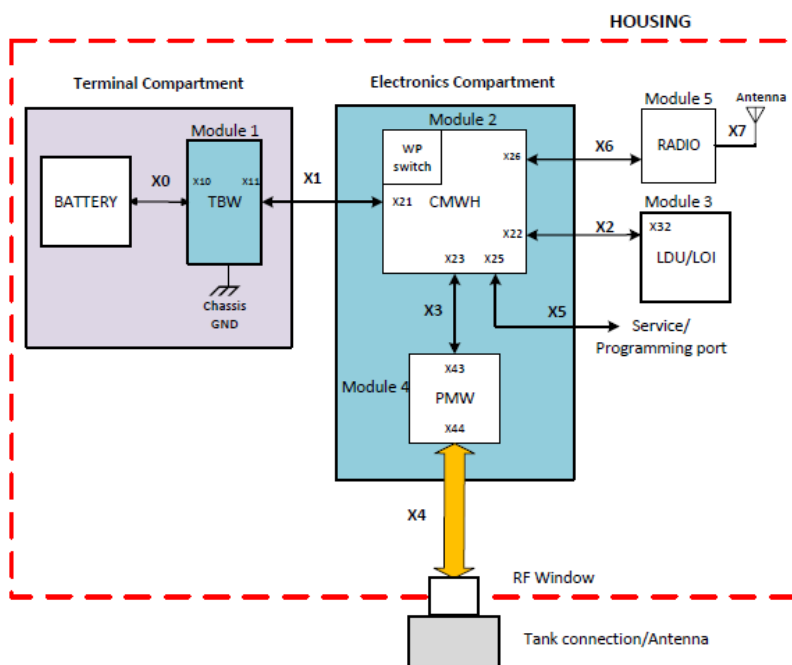


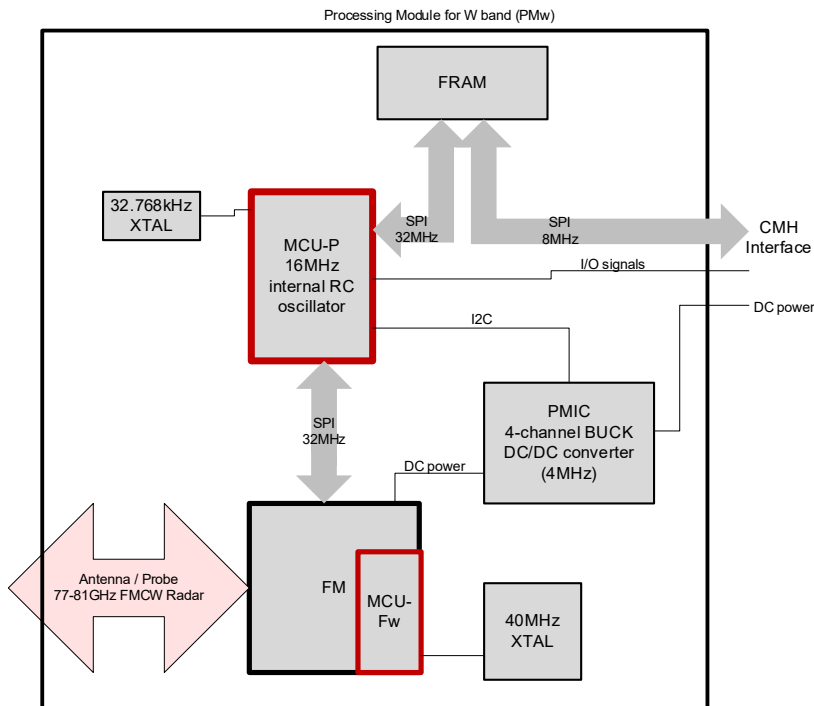
Figure 2: Block diagram of new product (3408 WIRELESS Level transmitter). Radar is PMW (Module 4). (WiHART is Module 5)



The rationale for reusing Radar test data are the identical PMW board, RF window, Tank Connection and Antennas. Thus, **the complete frequency generation and Microwave chain is unchanged.**

(Note: The Radio (Module 5) has modular approval, FCC ID LW2-RM5801).

A Block diagram for the common Microwave board (PMW) is shown below in Figure 3:



*Figure 3: Block diagram of the Microwave board (PMW).*

The oscillator frequencies on the PMW board are:

Y301	32.768 kHz	(reference for Microprocessor (MCU-P))
Y401	40 MHz	(reference for the Front-end Transceiver (FM))
	16.000 MHz	(Internally generated in Microprocessor (MCU-P))

(There is also a frequency generation (HART reference) on the CMH and CMWH respectively, both working at 3.6864 MHz.)



### Spot Check test plan:

For Verifying applicability of the data referencing, the following tests are suggested, and to be compared with the results from the test reports:

Test	Comment	Pass criteria <sup>1)</sup>
RF spectrum/ Temperature stability	Spot test of Low and High frequency ( $f_L$ and $f_H$ ) at: +20 C (Room temp) -30 C +50 C	+/- 10 MHz (+/- 125 ppm, <<3dB)
Spurious emissions > 40GHz.	Spot check: Measure band 50-75 GHz and 40-50 GHz.	+/- 3dB compared to reference measurements.

<sup>1)</sup> All Pass Criteria for the spot checks are within the 3 dB deviation from the Referenced data according to  $d_{dB} = |V_{dB} - R_{dB}| \leq 3 \text{ dB}$ .  
(Equation (1) in 484596 D01 Referencing Test Data v02r03).

Complete table below.

Upper section (Green) is for LPR, referenced test report is 1-3693/21-01-09.

Lower section (Orange) is for TLPR, referenced report is 1-3693/21-01-04.

FCC Rule/Part (IC, RSS-)	Referenced	Spot checked	Fully tested
§15.215(c) Frequency stability	Referenced, 1-3693/21-01-09 §12.1 (other temperatures)	Spot test of Low and High frequency ( $f_L$ and $f_H$ ) at: +20 C (Room temp), -30 C and +50 C. (Ref: 1-3693/21-01-09 §12.1)	
§15.256(f) Fundamental bandwidth (RSS-211, 2.4)	Referenced, 1-3693/21-01-09 §12.1	Same as above.	
§15.256(g) Fundamental emissions limit (RSS-211, 5.2b)			Y
§15.256(h) Unwanted emissions limit (RSS-211, 5.1d)	Referenced for frequencies 40- 200 GHz. (Ref: 1-3693/21- 01-09 §12.3, plot 8..plot 13)	Measure band 40-50 GHz. Reference: 1- 3693/21-01-09 §12.3, plot 8.	Fully tested 9 kHz...40 GHz.
§15.256(i) Antenna beamwidth (RSS-211, 5.2a)	(Manufacturer's data, same for referenced product)		(Manufacturer's data)
§15.256(j) Antenna side lobe gain (RSS-211, 5.2c)	(Manufacturer's data, same for referenced product)		(Manufacturer's data)



§15.256(k) Emissions from digital circuitry (RSS-Gen, 7.1)	Same as §15.256(h): Referenced for frequencies 40- 200 GHz. (Ref: 1-3693/21- 01-09 §12.3, plot 8-plot 13)		Same as §15.256(h): test band 9 kHz...40 GHz.
§15.209 Radiated emissions limits, general requirements	Referenced for frequencies 40- 200 GHz. (Ref: 1-3693/21- 01-04 §12.3, plot 9-plot 18)	Measure band 50-75 GHz. Reference: 1- 3693/21-01-04 §12.3, plot 10.	Fullt tested 9 kHz...40 GHz.
§15.109 Radiated emissions limits (w receiver)	Same as §15.209: Referenced for frequencies 40- 200 GHz. (Ref: 1-3693/21- 01-04 §12.3, plot 9-plot 18)		Same as §15.209: test band 9 kHz...40 GHz.

All Pass Criteria for the spot checks are within the 3 dB deviation from the Referenced data according to  $d_{dB} = |V_{dB} - R_{dB}| \leq 3 \text{ dB}$ .

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